



Forest Inventory & Analysis Factsheet Kentucky 2004

Forestland Area

Kentucky's forests cover 12.0 million acres or 47 percent of the State. This is a decrease of 729,000 acres since the previous forest inventory in 1988. Ninety-seven percent of the forestland is considered available for timber production. The remaining forestland area is unproductive forestland and reserved forestland where timber removals are prohibited by law.

Area by land class (million acres)

Land class	1949	1963	1975	1988	2004
Timberland	11.4	11.7	11.9	12.3	11.6
Other/reserved	0.1	0.1	0.3	0.4	0.3
Total forestland	11.5	11.9	12.2	12.7	12.0
Nonforestland	14.0	13.7	13.3	12.7	13.5
Total land area	25.5	25.5	25.5	25.4	25.4
Percent forested	45%	46%	48%	50%	47%

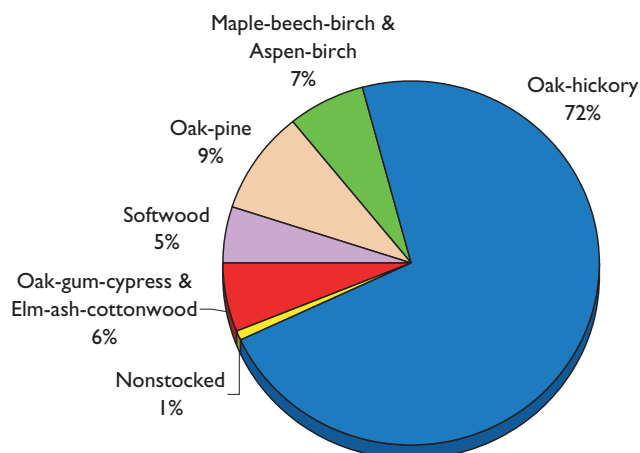
Totals may not sum due to rounding.

Total land area estimates changed slightly over time due to improvements in measurement techniques and refinements in classification of small bodies of water and streams.

Forest-Type Composition

Oak-hickory is the predominant forest type in the State, covering 8.4 million acres (72 percent of the timberland).

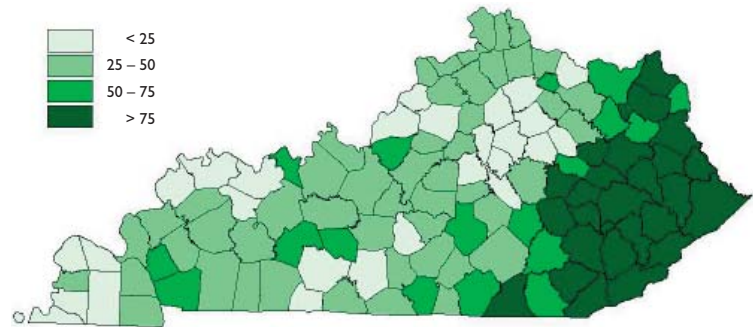
Area of timberland by forest-type group



Forest Distribution

The Cumberland Plateau and the Appalachians in the eastern portion of the State are the most heavily forested. The central and western portions of the State, although less densely forested, account for 50 percent of the total forestland area.

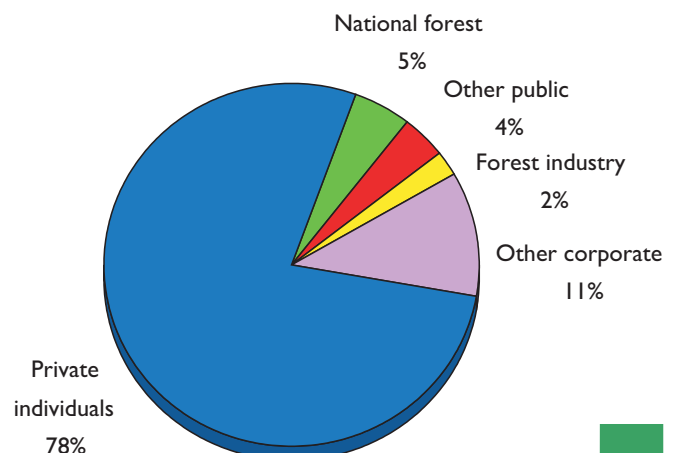
Percentage of land in forest by county



Ownership of the Forest

Private individuals own 78 percent of the timberland in Kentucky. Nine percent is public land administered by local, State, or federal agencies. Slightly more than one-half of the public timberland is managed by the U.S. Forest Service. Forest industry owns 2 percent of the timberland and other corporations account for the remaining 11 percent.

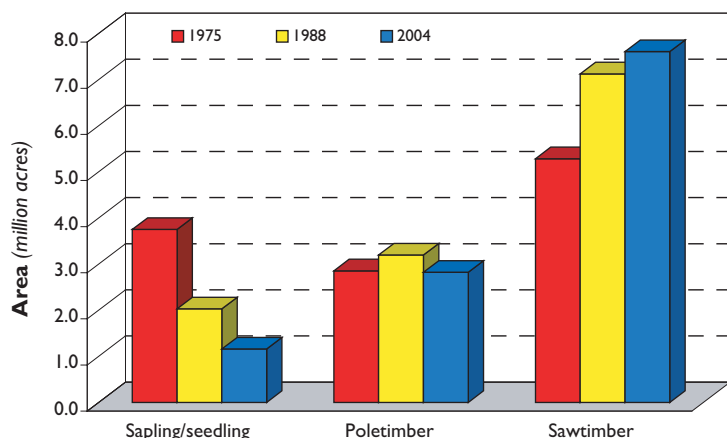
Ownership of timberland



Stand-Size Distribution

There has been a 7-percent increase in the number of acres in sawtimber-size stands on Kentucky's timberland since 1988. Sawtimber stands cover 7.6 million acres, or 66 percent of the timberland in the State. The number of acres of poletimber stands declined by 12 percent, while the acres of sapling-seedling stands declined by almost one-half.

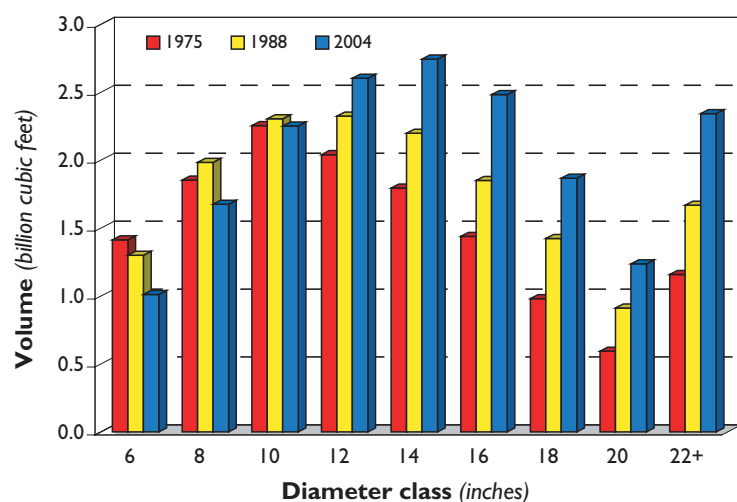
Area of timberland by stand size



Tree Volume

In spite of the reduction in forest area, growing-stock volume on timberland has increased from 16.0 billion cubic feet in 1988 to 18.2 billion cubic feet in 2004. The volume in sawtimber-size trees increased from 45.8 to 60.4 billion board feet. The overall increase in volume is due to an increase in the volume of trees 12-inches and greater in diameter.

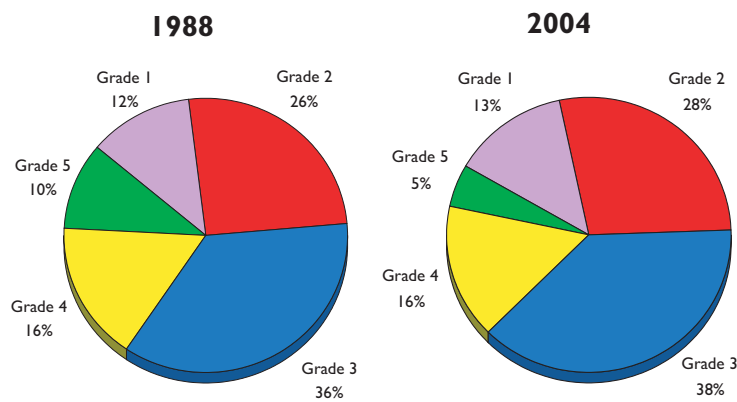
Growing-stock volume on timberland by diameter class



Hardwood Tree Grade Volume Distribution

The percentage of hardwood board-foot volume in tree grades 1 and 2 increased by 3 percent since 1988. The percentage of board foot volume in the lower quality grades 4 and 5 declined from 26 to 21 percent.

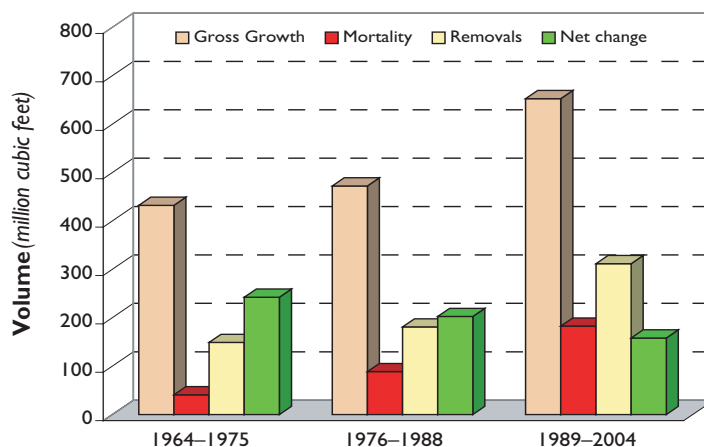
Hardwood sawtimber board foot volume on timberland by tree grade



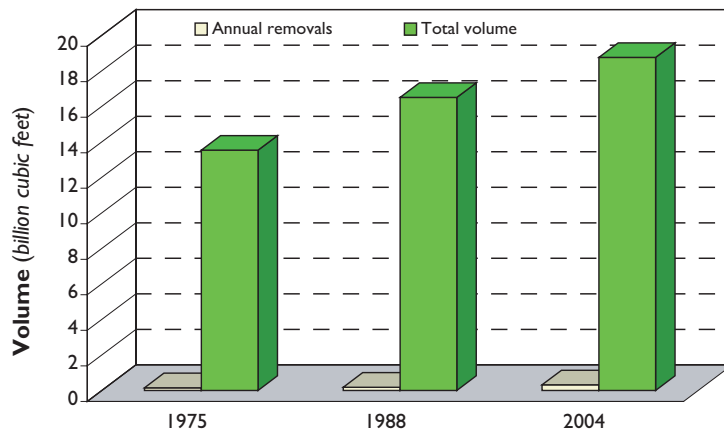
Annual Growth, Removals, and Mortality

The total growth of growing-stock volume averaged 652.7 million cubic feet annually. Mortality averaged 182.7 million cubic feet. Therefore, net growth averaged 470.0 million cubic feet. Timber removals averaged 311.8 million cubic feet, which is <2 percent of the current inventory. This results in a net average gain of 158.2 million cubic feet of growing-stock volume each year since 1988.

Average annual gross growth, removals, mortality, and net change of growing-stock trees on timberland



Average annual removals of growing stock vs. total growing-stock volume on timberland



Statistical Reliability—Kentucky 2004 Data

A measure of reliability of inventory statistics is provided by sampling errors. These sampling errors mean that the chances are two out of three that the true population value is within the limits indicated by a confidence interval. Sampling errors (in percent) and associated confidence intervals around the sample estimates for timberland area and inventory volumes are presented in the following table.

Item	Sample estimate and confidence interval			Sampling error percent
Timberland (thousand acres)	11,647.9	±	46.1	0.40
All live (million cubic feet)				
Inventory	21,187.9	±	304.9	1.44
Net annual growth	565.0	±	13.3	2.35
Annual removals	319.5	±	25.4	7.96
Annual mortality	204.1	±	13.9	6.80
Growing stock (million cubic feet)				
Inventory	18,217.4	±	294.2	1.61
Net annual growth	470.0	±	13.8	2.93
Annual removals	311.8	±	25.1	8.04
Annual mortality	182.7	±	12.0	6.58
Sawtimber (million board feet)				
Inventory	60,382.8	±	1,358.8	2.25
Net annual growth	2,181.4	±	81.4	3.73
Annual removals	1,166.3	±	103.2	8.85
Annual mortality	478.2	±	55.0	11.50

FIA inventories supported by the full complement of sample plots are designed to achieve reliable statistics at the survey unit and State levels. Sampling error increases as the area or volume considered decreases in magnitude. Sampling errors and associated confidence intervals are often unacceptably high for small components of the total resource. Statistical confidence may be computed for any subdivision of State totals using the following formula.

SE_s = SE_t * (sqrt(X_t) / sqrt(X_s))

where

SE_s = sampling error for subdivision of State total,

SE_t = sampling error for State total,

X_s = sum of values for the variable of interest (area or volume) for subdivision of State,

X_t = total area or volume for State.

For example, the number of acres of timberland owned by forestry industry is estimated at 278.8 thousand acres. The estimate of sampling error for this example is computed as:

SE_s = 0.40 * (sqrt(11,647.9) / sqrt(278.8)) = 2.59

Thus, the sampling error is 2.59 percent, and the resulting confidence interval of one standard error (two times out of three) for area of timberland owned by forest industry is 278.8 ± 7.2 thousand acres. To achieve the 95 percent confidence interval, the standard error is multiplied by 1.96 or 278.8 ± 14.1 thousand acres.

Sampling errors obtained from this method are only approximations of reliability because this process assumes constant variance across all subdivisions of totals.

Precautions

Traditional users of FIA data are accustomed to the highly variable accuracy of small subsets of population totals. All FIA published reports devote a chapter that explains sampling errors and provide cautions about the reliability of sub-populations such as county-level statistics. Therefore, when summarizing statistics, it is strongly recommended that users beware of any subdivision below the survey unit level. Users should familiarize themselves with the procedures to compute sampling error as outlined above.

Definition of Terms

Average annual gross growth. Average annual increase in volume of trees 5.0 inches d.b.h. and larger in the absence of cutting and mortality. Gross growth includes survivor growth, ingrowth, growth on ingrowth, growth on removals before removal, and growth on mortality before death.

Average annual mortality. Average annual volume of trees 5.0 inches d.b.h. and larger that died from natural causes during the intersurvey period.

Average annual net growth. Average annual net change in volume of trees 5.0 inches d.b.h and larger in the absence of removals during the intersurvey period. Average annual net growth is equal to average annual gross growth minus average annual mortality.

Average annual removals. Average annual volume of trees 5.0 inches d.b.h. and larger removed from the inventory by harvesting, cultural operations, (such as timber-stand improvement), land clearing, or changes in land use during the intersurvey period.

D.b.h. Tree diameter in inches (outside bark) at breast height (4.5 feet above ground level).

Forestland. Land at least 10 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. The minimum area considered for classification is 1 acre. Forested strips must be at least 120 feet wide.

Forest industry. Companies or individuals operating primary wood-using plants.

Forest type. A classification of forestland based on the species forming a plurality of live tree stocking.

Growing-stock trees. Live trees that contain at least one 12-foot or two 8-foot logs in the saw-log portion, either currently or potentially if too small to qualify as a saw log. The log(s) must meet dimension and merchantability standards to qualify. Trees must have one-third of the gross board foot volume in sound wood, either currently or potentially.

Growth to removal ratio. Comparison of the amount of growth volume to the amount of volume removed by human activity, including harvesting, land clearing, or changes in land use during the inter-survey period. The growth to removal ratio is equal to the average net annual growth divided by average net annual removals. If the ratio is >1 , then wood volume is being added to the inventory. If it is <1 , then the inventory is decreasing.

Hardwoods. Dicotyledonous trees, usually broadleaf and deciduous.

Nonforestland. Land that either has never supported forests or land formerly forested that has been developed for other uses, including cultural, agricultural, etc.

Other forestland. Forestland that is incapable of producing 20 cubic feet of wood volume per acre annually under natural conditions due to adverse site conditions such as sterile soils, dry climate, poor drainage, high elevation, steepness, or rockiness.

Other private. Land owned by individuals and corporations, including individual and corporate farms, where the owner does not own a primary wood-using plant. This land is often referred to as nonindustrial private forestland (NIPF).

Poletimber. Softwood species 5.0 to 8.9 inches d.b.h. and hardwoods 5.0 to 10.9 inches d.b.h.

Reserved forestland. Public forestland capable of producing 20 cubic feet of wood volume per acre annually, but is withdrawn from timber utilization through statute or administrative regulation.

Saplings. Trees 1.0 to 4.9 inches d.b.h.

Sawtimber. Softwood species 9.0 inches d.b.h. and larger and hardwoods 11.0 inches d.b.h. and larger.

Seedlings. Trees <1.0 inch d.b.h. and >1 foot tall for hardwoods, >6 inches tall for softwoods.

Softwoods. Coniferous trees, usually evergreen, having leaves that are needles or scalelike.

Stand-size class. A classification of forestland based on the diameter class distribution of live trees in the stand.

Timberland. Forestland capable of producing 20 cubic feet of wood volume per acre annually and not withdrawn from timber utilization.

Tree. Woody plants having one erect perennial stem or trunk at least 3 inches d.b.h., a more or less definitely formed crown of foliage, and a height of at least 13 feet at maturity.

Tree grade. A classification of the saw-log portion of sawtimber trees based on the grade of the butt log or the ability to produce at least one 12-foot log or two 8-foot logs in the upper section of the saw-log portion. Tree grade is an indicator of quality; grade 1 is the best quality.

Volume. The amount of sound wood in live trees at least 5.0 inches d.b.h. from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem.

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